

①

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Subject :: Quantity Survey & Estimation

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Answer #01 (i)

Solution ⇒

Quantity of wet material = 100 cft  
Dry density of concrete = 1.54

Quantity of dry material =  $100 \times 1.54$   
= 154 cft.

Ratio of concrete = 1:4:8  
Sum of ratio = 13

Quantity of cement =  $\frac{\text{Ratio of cement}}{\text{sum of ratio}} \times \text{Dry material}$

$$= \frac{1}{13} \times 154 = 11.84 \text{ cft}$$

$$\therefore 1 \text{ bag} = 1.25 \text{ cft} \quad 11.84 / 1.25$$

$$\Rightarrow 9.47 \approx 10 \text{ bags of cements}$$

2

$$\text{Quantity of sand} = \frac{\text{Ratio of sand}}{\text{Sum of ratio}} \times \text{Dry material}$$

$$= \frac{4}{13} \times 154 = 47.38 \text{ cft}$$

$$\text{Quantity of aggregate} = \frac{\text{Ratio of coarse agg}}{\text{Sum of Dry}} \times \text{Dry material}$$

$$= \frac{8}{13} \times 154$$

$$= 94.76 \text{ cft}$$

$$\text{Volume of brick} = 75 \text{ cft}$$

Taking 25% of brick work for mortar

$$\frac{25}{100} \times 75 = 18.75 \text{ cft (wet volume)}$$

For dry volume volume of mortar we have a multiply factor 1.27 with wet

$$\text{Dry volume} = 18.75 \times 1.27 = 23.81 \text{ cft}$$

$$\text{Ratio} = 1:4$$

$$\text{Sum of ratio} = 5$$

$$\text{Quantity of cement} = \frac{\text{ratio of cement}}{\text{Sum of ratio}} \times \text{Dry material}$$

$$= \frac{1}{5} \times 23.81$$

$$\text{Quantity of cement} = 4.76 \text{ cft} \quad \therefore 1:4 = 1+4 = 5$$

Note 1 bag = 1.25 cft

$$4.76 / 1.25 = 3.8 \text{ bag or 4 bags}$$

$$\text{Quantity of sand} = \frac{\text{Ratio of sand}}{\text{Sum of ratio}} \times \text{dry material}$$

$$= \frac{4}{5} \times 23.81 = 19 \text{ cft}$$

$$\text{Volume of mortar} \quad \frac{25}{100} \times 75 = 18.75 \text{ cft}$$

$$= \boxed{18.75 \text{ cft}} \text{ wet volume}$$

## Answer # 1 (ii)

Ans Dry and wet volume of Concrete:

- ⇒ Dry volume of concrete is the combined volume of cement, fine aggregate and coarse aggregates in dry condition.
- ⇒ After mixing the resultant wet volume turns out to be approximately 60-70% of the dry volume.
- ⇒ For estimation purpose dry volume of concrete can be taken as 1.54 of its wet volume.

For concrete  $1 \text{ cm} = 54\%$

$$\begin{aligned} \text{Dry volume} &= \text{wet volume} + 54\% \\ &= 1 + 0.54 \end{aligned}$$

$$\text{Dry volume} = 1.54$$

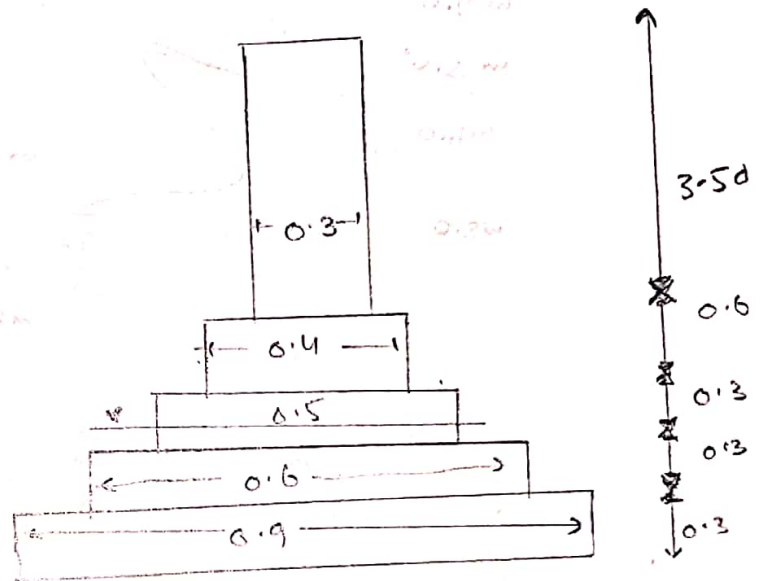
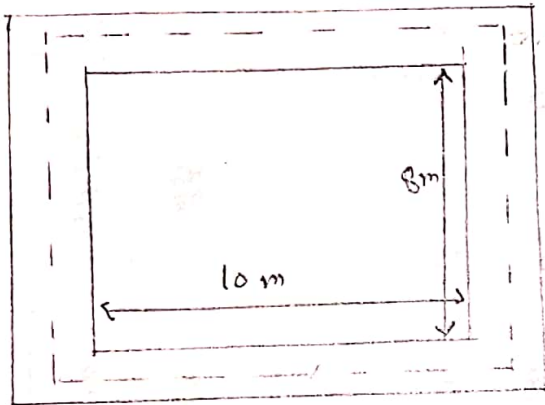
⇒ For essential purpose of dry volume of mortar can be taken 1.27 & 1.54 times of its wet volume.

$$\begin{aligned} \text{For cement mortar} &= 1 \text{ cm} \\ &= 27\% \text{ or } 57\% \end{aligned}$$

$$\text{Dry volume} = \text{wet volume} + 27\% \text{ of wet volume}$$

$$= 1 + \left(\frac{27}{100} + 1\right) = 1 + 0.27$$

$$\boxed{\text{Dry volume} = 1.27}$$

Question #02Solution =>

$$\text{Center to centre length of long wall} = 10 + (\frac{1}{2} \times 0.3) + (\frac{1}{2} \times 0.3)$$

$$\text{C.C of long wall} = 10.3 \text{ m}$$

$$\text{C.C length of short wall} = 8 + (\frac{1}{2} \times 0.3) + (\frac{1}{2} \times 0.3)$$

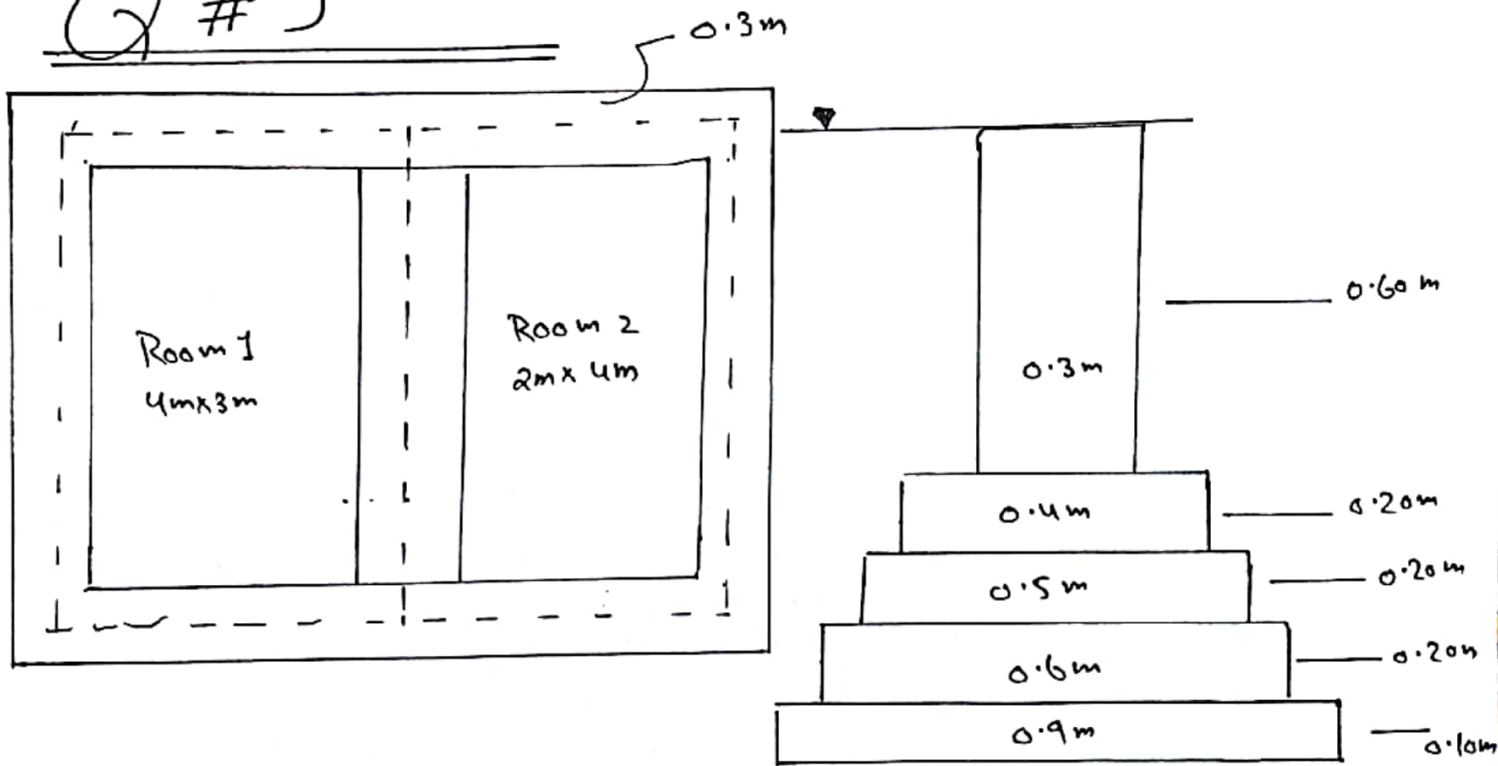
$$= 8.3 \text{ m}$$



# Detail of Measurement and Calculation of Quantities

Sr. No	Item Description	No	Length	Breadth	Height	Quantity	Note
①	Excavation & Foundation						
	Long wall	2	11.20 m	0.90 m	0.90 m	18.14	$10.3 + 0.90 = 11.2 \text{ m}$ $8.3 - 0.90 = 7.4 \text{ m}$
Short wall	2	7.4 m	0.90 m	0.90 m	11.98		
						30.12 cum	
②	Concrete of Foundation						
	Long wall	2	11.20 m	0.90 m	0.30 m	6.04	
Short wall	2	7.4 m	0.90 m	0.30 m	3.99		
						10.03 cum	
③	Brick work in foundation and plinth						
	1st footing	2	10.9 m	0.60	0.30	3.92	$L = 10.3 + 0.6 = 10.9 \text{ m}$ $L = 10.3 + 0.50 = 10.8 \text{ m}$ $L = 10.3 + 0.40 = 10.7 \text{ m}$
	2nd footing	2	10.80 m	0.50	0.30	3.24	
	Plinth wall	2	10.70 m	0.40	0.30	2.56	
	Short wall					2.77	$8.30 - 0.60 = 7.7 \text{ m}$ $8.30 - 0.50 = 7.8 \text{ m}$ $8.30 - 0.40 = 7.2 \text{ m}$
	1st footing	2	7.70	0.60	0.30	2.34	
	2nd footing	2	7.80	0.50	0.30	1.89	
	Plinth wall	2	7.90	0.4	0.30	16.72 cum	
④	Brick work in super structure						
	Long wall	2	10.6 m	0.30 m	3.50 m	22.26	$10.30 + 0.30$ $8.30 - 0.30 = 8 \text{ m}$
Short wall	2	8 m	0.30 m	3.50 m	16.80		
						39.06 cum	

Q # 3



Solution :-

Room 1

$$S(V) = 2(0.15 + 3 + 0.15) = 6.6 \text{ m}$$

$$S(H) = 2(0.15 + 4 + 0.15) = 8.6 \text{ m}$$

$$C.L = 6.6 + 8.6 = 15.2 \text{ m}$$

Room 2

$$S(H) = 2(0.15 + 4 + 0.15) = 8.6 \text{ m}$$

$$S(V) = 2(0.15 + 2 + 0.15) = 4.6 \text{ m}$$

$$C.L = 8.6 + 4.6 = 13.2 \text{ m}$$

$$C.L \text{ of Room 1} + C.L \text{ of Room 2}$$

$$15.2 \text{ m} + 13.2 \text{ m}$$

$$C.L = 28.4 \text{ m}$$

S.No	Description	L	B	H	Q	Remarks
①	Excavation in foundation	20.90	0.90	1.30	24.45	$L = C.L - (b/2) \times \text{no T-junction}$ $= 20.90$
②	PCC in foundation	20.90	0.90	0.10	1.88	
③	Brick in foundation					
	step: 01	21.20	0.60	0.20	2.544	$2 \times 0.90 \times (0.3/2)^2$
	Step: 02	21.30	0.50	0.20	2.13	$L = C.L - (b/2) \times \text{no T-junction}$
	step: 03	21.40	0.4	0.20	1.712	$L = C.L - (b/2) \times \text{no T-junction}$
	Step 04	21.50	0.3	0.60	3.87	$L = C.L - (b/2) \times 2$

Total brick work quantity = 10.256 cubic meter